

### Example No. 3: Next generation of mechanical surface testers

The figure shows the schematic sketch for a nanoindenter of the next generation (with special thanks to ASMEC). In principle, the additional degree of freedom due to the lateral force would open up a completely new world of opportunities for the measurement of things like:

- intrinsic stresses
- anisotropy
- fracture toughness
- Poisson's ratio
- etc.

if there wouldn't be one very important but rather neglected effect, namely

**→ the tilting of the indenter (it is always there).**

With the SIO-software the tilting moment can be taken into account and the following example shows how big this effect can be even in the case of very stiff and compact lateral force units as they are also used in modern AFMs for instance. Even though the tilting angle of the indenter shaft was only  $0.06^\circ$  (!), the difference between the classical and the correct SIO-calculation is almost 25%. The classical approach would completely underestimate the yield stress in the example shown in the figure below.

